

Tuberculosis in the United States

National Tuberculosis Surveillance System Highlights from 2011

Slide 1 (title slide). Tuberculosis in the United States—National Tuberculosis Surveillance System, Highlights from 2011. This slide set was prepared by the Division of Tuberculosis Elimination, Centers for Disease Control and Prevention (CDC), Department of Health and Human Services (DHHS). It provides trends for the recent past and highlights data collected through the National Tuberculosis Surveillance System for 2011. Since 1953, through the cooperation of state and local health departments, CDC has collected information on newly reported cases of tuberculosis (TB) disease in the United States. The data presented here were collected via the revised TB case report introduced in 2009. Currently, each individual TB case report (Report of Verified Case of Tuberculosis or RVCT) is submitted electronically to CDC. The data for this slide set are based on updates received by CDC as of June 25, 2012. All case counts and rates for years 1993–2011 have been updated.

Slide 2. Reported TB Cases, United States, 1982–2011. The resurgence of TB in the mid-1980s was marked by several years of increasing case counts until its peak in 1992. Case counts began decreasing again in 1993, and 2011 marked the nineteenth year of decline in the total number of TB cases reported in the United States since the peak of the resurgence. From 1992 until 2002, the total number of TB cases decreased 5%–7% annually. From 2002 to 2003, however, the total number of TB cases decreased by only 1.4%. An unprecedented decrease occurred in 2009, when the total number of TB cases decreased by more than 10% from 2008 to 2009. In 2011, a total of 10,528 cases were reported from the 50 states and the District of Columbia (DC). This represents a decline of 5.8% from 2010 and approximately 60.5% from 1992.

Slide 3. TB Morbidity, United States, 2005–2011. This slide provides the total number of reported U.S. TB cases and the associated rates for each of the past 6 years. Rate is defined as cases per 100,000 population. The number of TB cases decreased from 13,727 in 2006 to 10,528 in 2011, and the TB rate decreased from 4.6 in 2006 to 3.4 in 2011.

Slide 4. TB Case Rates, United States, 2011. This map shows TB rates for 2011. Thirty-seven states reported a rate less than 3.4 TB cases per 100,000, the 2011 national average. Thirteen states and DC reported a rate above 3.4 TB cases per 100,000; these accounted for 67% of the national total in 2011 and have experienced substantial overall decreases in cases and rates from 1992 through 2011.

Slide 5. TB Case Rates by Age Group, United States, 1993–2011. This slide shows the last 19 years' declining trend in TB rates by age group. Starting in 2011, case rates in all age groups have declined by more than 50%: persons 65 years and older (from 17.7 per 100,000 in 1993 to 5.4 in 2011); adults aged 45 to 64 years (from 12.4 to 4.0); adults aged 25 to 44 years (from 11.5 to 4.1); those 15 to 24 years of age (from 5.0 to 2.4); and in children under 15 years of age (from 2.9 to 0.9).

Slide 6. Reported TB Cases by Age Group, United States, 2011. This pie chart shows the age distribution of persons reported with TB in 2011. Five percent were children under 15 years of age, 10% were age 15 to 24, 32% were age 25 to 44, 31% were age 45 to 64, and 21% were at least 65 years old.

Slide 7. TB Case Rates by Age Group and Sex, United States, 2011. This slide graphs the TB rates in 2011 by age group and sex. It shows that rates tended to increase with age, ranging from a low of less than 1 per 100,000 in children aged 5 - 14 to a high of 7.4 per 100,000 in men 65 years and older. As age increased, the case rate in men increased faster than women; the rates in men 45 years and older were approximately more than twice those in same-age women.

Slide 8. TB Case Rates by Race/Ethnicity, United States, 2003–2011. This slide shows the declining trend in TB rates by race/ethnicity during the last 9 years. Asians had the highest TB rates, which declined from 29.9 per 100,000 in 2003 to 20.9 in 2011, and had a percent decline over the time period of 30%. Rates also declined in the following racial/ethnic groups: among non-Hispanic blacks or African-Americans, from 11.7 in 2003 to 6.3 in 2011 (-46%); among Hispanics, from 10.3 to 5.8 (-44%); among American Indians and Alaska Natives, from 8.2 to 5.6 (-32%); and among non-Hispanic whites, from 1.4 to 0.8 (-43%). Rates decreased among Native Hawaiian or Other Pacific Islanders after two years of increase since 2008, from 16.2 in 2003 to 15.9 in 2011 (-2%).

Several important factors likely contribute to the disproportionate burden of TB in minorities. In persons who were born in countries where TB is common, TB disease may result from infection acquired in the country of origin. Unequal distribution of TB risk factors, such as HIV infection, may also contribute to increased exposure to TB or to an increased risk of developing TB once infected with *M. tuberculosis*.

Slide 9. TB Case Rates by Age Group and Race/Ethnicity, United States, 2011. This slide presents TB rates in 2011 by age group and race/ethnicity. After infancy (age under 5), risk typically increased with age across all racial and ethnic groups. Rates were consistently higher in minority racial and ethnic groups than in non-Hispanic whites. Rates were the highest in Asians and Native Hawaiians and Other Pacific Islanders, particularly in adult age groups. The impact of foreign birth is a consideration in interpreting rate variations by race/ethnicity. For example, 96% of cases in the Asian group occurred in foreign-born persons, compared with 74% of cases in Hispanics and 36% of cases in non-Hispanic blacks or African-Americans. Persons reporting two or more races totaled less than 1% of all cases.

Slide 10. Reported TB Cases by Race/Ethnicity, United States, 2011. In 2011, 84% of all reported TB cases occurred in racial and ethnic minorities (29% in Hispanics, 30% in Asians, 23% in non-Hispanic blacks or African-Americans, 1% in American Indians or Alaska Natives, and 1% in Native Hawaiians or Other Pacific Islanders), whereas 16% of cases occurred in non-Hispanic whites. Persons reporting two or more races totaled less than 1% of all cases. This is the first year that Asians have constituted the single largest percentage of TB cases among all racial/ethnic groups; Hispanics had previously held the largest TB percentage for seven years. Non-Hispanic blacks or African Americans have remained the third largest racial/ethnic group for four years now.

Slide 11. Number of TB Cases in U.S.-born vs. Foreign-born Persons, United States, 1993–2011. This graph plots the number of U.S.-born vs. foreign-born persons reported with TB each year, from 1993 through 2011. It illustrates the increase in the percentage of cases occurring in foreign-born persons during this period, from 29% in 1993 to 62% in 2011. Overall, the number of cases in foreign-born persons remained virtually level, with approximately 7,000–8,000 cases each year before 2009, until 2009 when the number dropped to 6,854. That decreasing trend continued in 2011 with the number of foreign-born cases dropping to 6,510. The number in U.S.-born persons decreased from more than 17,000 in 1993 to 3,981 in 2011.

Slide 12. Trends in TB Cases in Foreign-born Persons, United States, 1991–2011. This slide shows trends in the past 20 years of TB cases in foreign-born persons in the United States from 1991 through 2011. The percentage of TB cases accounted for by foreign-born persons increased from 28% in 1990 to 62% in 2011.

Slide 13. Reported TB Cases by Origin and Race/Ethnicity, United States, 2011. Among U.S.-born persons with TB in 2011, 39% were non-Hispanic black or African-American, 33% were non-Hispanic white, 19% were Hispanic or Latino, 3% were Asian, 3% were American Indian or Alaska Native, and 2% were Native Hawaiian or Other Pacific Islander. Among the foreign-born, 46% were Asian, 34% were Hispanic or Latino, 13% were non-Hispanic black or African-American, and 5% were non-Hispanic white. Cases among American Indians or Alaska Natives and among Native Hawaiians or Other Pacific Islanders constituted less than 1%, respectively, of the cases among the foreign-born and are not shown. Persons reporting two or more races totaled less than 1% of all cases.

Slide 14. Percentage of TB Cases Among Foreign-born Persons, United States, 2001 and 2011. The percentage range of the total number of TB cases that occurred in foreign-born persons in each state is highlighted for 2001 and 2011 in these side-by-side maps. The number of states with less than 25% of their TB cases among the foreign-born decreased from 13 states in 2001 to 6 states in 2011. The number of states with at least 25-49% of cases among the foreign-born decreased from 14 states in 2001 to 11 states in 2011. However, the number of states that had 50% or more of their cases among the foreign-born increased from 23 states in 2001 to 34 states in 2011.

Slide 15. TB Case Rates in U.S.-born vs. Foreign-born Persons, United States, 1993–2011. TB rates in foreign-born persons remain higher than those in the U.S.-born population. From 1993 through 2011, the rates in U.S.-born persons decreased from 7.4 per 100,000 to 1.5, whereas the rates in foreign-born persons decreased from 34.0 per 100,000 to 17.2.

Slide 16. TB Case Rates in U.S.-born vs. Foreign-born Persons, United States, 1993–2011. This is the same as Slide 15, but the rates are presented on a logarithmic scale to better illustrate the trend in TB rates among the U.S.-born and foreign-born. The lines show a greater rate of decline among the U.S.-born compared with the foreign-born during this period.

Slide 17. Countries of Birth of Foreign-born Persons Reported with TB, United States, 2011. This slide shows the overall distribution of the countries of birth of foreign-born persons reported with TB in 2011, with the top seven highlighted. The list of countries has remained relatively constant since 1986, when information on country of birth was first reported by all areas submitting reports to CDC. In 2011 the seven top countries accounted for 61% of the total cases, with Mexico accounting for 22%; the Philippines, 11.6%; Vietnam, 8.4%; India, 7.7%; China, 5.8%; Haiti, 2.9%; and Guatemala, 2.5%. Persons from more than 135 other countries each accounted for 2% or less of the total, but altogether accounted for 39% of foreign-born persons reported with TB.

Slide 18. Percent of Foreign-born with TB by Time of Residence in U.S. Prior to Diagnosis, 2011. The length of U.S. residence among foreign-born persons prior to their TB diagnosis in 2011 is shown in these stacked bars. Overall, 14% had been in the United States for less than 1 year, 17% between 1 and 4 years, and 59% for at least 5 years. The distribution is also shown for the top three countries of birth: Mexico, the Philippines, and Vietnam. Among persons born in Mexico, 9% had been in the United States for less than 1 year, 11% between 1 and 4 years, and 66% for at least 5 years. Among persons born in the Philippines, 15% had been in the United States for less than 1 year, 13% between 1 and 4 years, and 61% for at least 5 years. Among persons born in Vietnam, 10% had been in the United States for less than 1 year, 12% between 1 and 4 years, and 62% for at least 5 years.

Slide 19. Primary Anti-TB Drug Resistance, United States, 1993–2011. Primary drug resistance is shown for the past 19 years. The graph starts in 1993, the year in which the individual TB case reports submitted to the national surveillance system began collecting information on initial susceptibility test results for patients with culture-positive TB. Data were available for more than 85% of culture-positive cases for each year. Primary resistance was calculated by using data from persons with no reported prior TB episode. Resistance to at least isoniazid remained between 7.0% and 8.6% between 1993 and 2010, however in 2011, this increased to 9.2%. Resistance to at least isoniazid and rifampin, known as multidrug-resistant TB (MDR TB), decreased from 2.5% in 1993 to 1.1% in 1997, and remained at approximately 1.0% until 2009 and 2010 when it increased to 1.1% and 1.2%, respectively. In 2011, it increased again to 1.3%.

Slide 20. Primary MDR TB, United States, 1993–2011. This graph focuses on trends in primary MDR TB (based on initial isolates from persons with no prior history of TB) in the United States from 1993 through 2011. The number of primary MDR TB cases, represented by bars, steadily declined from 407 in 1993 to 115 in 2001. Since then, the total number of primary MDR TB cases has fluctuated from 86 to 132 cases, with 98 cases reported for 2011. Primary MDR TB, shown by the line, decreased from 2.5% in 1993 to approximately 1.1% in 1997, and has fluctuated around 1.0% since then. In 2011, the percentage increased to 1.3%.

Slide 21. Primary Isoniazid Resistance in U.S.-born vs. Foreign-born Persons, United States, 1993–2011. This graph shows primary isoniazid resistance in U.S.-born vs. foreign-born persons. Based on initial isolates from persons with no prior history of TB, the percentage of isoniazid resistance was approximately two times higher among foreign-born persons than among U.S.-born persons. In foreign-born persons, the percentage declined from 12.4% in 1993 to 10.7% in 2011. In U.S.-born persons, the percentage decreased from 6.8% in 1993 to 4.2% in 2007, but has increased since then to 6.5% in 2011.

Slide 22. Primary MDR TB in U.S.-born vs. Foreign-born Persons, United States, 1993–2011. This graph highlights primary MDR TB in U.S.-born versus foreign-born persons. The percentage with primary MDR TB has declined among both groups since 1993, although the decline in the U.S.-born has been greater. As a result, the proportion of primary MDR TB cases in the US that are attributed to foreign-born persons increased from approximately 25% in 1993 to 83% in 2011 (not shown on slide). Among the U.S.-born, the percentage with primary MDR TB remained between 0.4% and 0.7% from 1999 through 2010 and was 0.6% in 2011. The percentage among foreign-born persons has fluctuated year by year, while averaging approximately 1.5% from 1999 through 2010. In 2011, the percentage of primary MDR TB among foreign-born persons was 1.7%

Slide 23. Extensively Drug Resistant (XDR) TB, as Defined on Initial Drug Susceptibility Testing (DST), United States, 1993–2011. This graph shows the annual number of counted XDR TB cases as defined on initial DST from 1993–2011, reported as of June 25, 2012; XDR TB is defined as resistance to isoniazid and rifampin, plus resistance to any fluoroquinolone and at least one of three injectable second-line anti-TB drugs. Six cases of XDR TB were reported in 2011. The most reported in a single year was 10 in 1993, while there were no cases reported in 2003 and 2009. There is no apparent trend in the number of cases over time.

Slide 24. Reporting of HIV Test Results in Persons with TB by Age Group, United States, 1993–2011. This slide shows the completeness of reporting of HIV test results in persons with TB by age group from 1993 through 2011. The percentage of TB patients for whom test results were reported increased from 30% among all ages in 1993 to 82% in 2011. Among adults aged 25–44 years, the percentage increased from 46% in 1993 to 90% in 2011. California began reporting HIV test results to CDC in 2011; this accounts for the substantial percentage increase for that year.

Slide 25. Estimated HIV Coinfection in Persons Reported with TB, United States, 1993–2011. This slide provides minimum estimates of HIV coinfection among persons reported with TB from 1993 through 2011. Since the addition of the request for HIV status to the individual TB case report in 1993, incomplete reporting has provided a challenge to calculating reliable estimates. Results from the cross-matching of TB and AIDS registries have been used to supplement reported HIV test results. For all ages, the estimated percentage of HIV coinfection in persons reported with TB decreased from 15% to 6% overall and from 29% to 10% in persons aged 25 to 44 years during this period.

Slide 26. TB Cases by Residence in Correctional Facilities, Age ≥15, United States, 1993–2011. This graph highlights the number of cases that were a resident of any type of correctional facility at the time of TB diagnosis. Cases must have been 15 years of age or greater. The number of cases residing in a correctional facility has decreased from 1,117 cases in 1994 to 424 cases in 2011. Between the years 2000 and 2010, the number of cases residing in a correctional facility has fluctuated between 587 (in 2000) to as low as 460 (in 2002). The first year to drop below this range was 2011, to 424 cases. Of total cases, the percentage of cases residing in a correctional facility has ranged from 5.1% in 1994 to 3.3% in 2002. The 1990s saw a decreasing trend in percentage until 2002. Since 2002, the trend has showed an

increase; in 2010 the percentage of total cases was 4.7%. In 2011, this percentage decreased to 4.3%, only the second decrease since 2002.

Slide 27. TB Cases by Homeless Status, Age ≥ 15 , United States, 1993-2011. This graph shows the number of TB cases reported to be homeless within twelve months prior to their TB diagnosis from 1993 through 2011. Cases must have been above 14 years of age. The number of homeless cases has decreased from a high of 1379 cases in 1994 to 565 in 2011 and parallels the overall decline in cases during this time. This category has seen a continuous decrease in cases since 1994; the years 2003, 2006, and 2010 have been exceptions with a small increase in cases. Of total cases, 6.8% were homeless in 1994 and percentages have ranged between 7.5% in 1993 and 5.4% in 2009. Since 2009 there has been a small increase in 2010 (5.7%) and in 2011 (5.8%).

Slide 28. Mode of Treatment Administration in Persons Reported with TB, United States, 1993–2009. In 1993, the reporting areas began providing information about mode of treatment administration on the individual TB case report form. Treatment administered as only directly observed therapy (DOT) increased from 21.7% in 1993 to 59.5% in 2009, the latest year with available data. The proportion of patients who received at least some portion of their treatment as DOT (based on combining the percentage of patients who received only DOT and the percentage for whom some portion was self-administered) remained the same in 2009 as it was in 2008. In 2009, 89.8% of patients received at least some portion of their treatment as DOT.

Slide 29. Completion of TB Therapy, United States, 1993–2009. The reporting areas began providing information on completion of therapy in 1993 through the individual TB case report form. The calculations exclude persons with initial isolate rifampin resistant, or patient with meningeal disease, or pediatric patient (aged <15) with miliary disease or positive blood culture. Overall completion of therapy had remained at approximately 92-93% from 1998 through 2008, but increased to 95% in 2009.. Completion in 1 year or less increased from 64% in 1993 to 88% in 2009, the latest year with available data. The current DHHS Healthy People 2020 objective is completion of therapy in 1 year or less in 93% of patients. CDC is working with state and local health departments to determine and evaluate reasons for apparently delayed completion of therapy, which may vary by jurisdiction.